

What is claimed is:

- 1       1.     A memory device, comprising:  
2             an array of a magnetic storage cells, each cell comprising a first magnetic  
3                 layer, a second magnetic layer, and a dielectric in between each said  
4                 first and second magnetic layers;  
5             a first set of conductors to receive current for writing data to said magnetic  
6                 storage cells; and  
7             a second set of conductors for heating said at least one magnetic storage cell  
8                 when writing a bit of data to said at least one.
  
- 1       2.     The memory device of claim 1, wherein the first set of conductors is  
2             electrically isolated from the second set of conductors within the array  
3                 of magnetic storage cells.
  
- 1       3.     The memory device of claim 1, wherein heating said at least one magnetic  
2             storage cell reduces the magnetic coercivity of at least one of the first  
3                 and second magnetic layers comprising the magnetic storage cell.
  
- 1       4.     The memory device of claim 1, wherein the array of magnetic storage cells  
2             comprise spin tunneling storage cells.
  
- 1       5.     The memory device of claim 1, wherein the array of magnetic storage cells  
2             comprise giant magnetoresistive storage cells.
  
- 1       6.     The memory device of claim 1, wherein said array of magnetic storage cells  
2             comprise anisotropic magnetoresistive material.

- 1           7.     The memory device of claim 1, wherein said array of magnetic storage cells  
2                   comprise any magnetoresistive storage material.
- 1           8.     The memory device of claim 1 wherein said magnetic storage cells serve as  
2                   electrical heating elements.
- 1           9.     The memory device of claim 8, wherein said at least one magnetic storage cell  
2                   is heated by current flowing through said second set of conductors and  
3                   through said at least one magnetic storage cell.
- 1           10.    The memory device of claim 1, wherein said second conductor set includes a  
2                   heater element placed in series with at least one of the conductors of  
3                   the second conductor set.
- 1           11.    The memory device of claim 10, wherein said heater element is a resistive  
2                   device.
- 1           12.    The memory device of claim 1, wherein said magnetic memory device  
2                   includes a heater element placed in series with at least one of the said  
3                   magnetic storage cells.
- 1           13.    A method for storing data comprising:  
2                   applying a voltage on a sense current conductors and across a storage cell to  
3                   heat the storage cell;  
4                   after the storage cell is heated, writing data to said storage cell; and  
5                   then removing said voltage across said storage cell.
- 1           14.    The method of claim 13, wherein said storage cell is a magnetic storage cell.

1           15.     The method of claim 13, wherein said storage cell is a spin tunneling storage  
2                     cell.

1           16.     A method for writing data to a magnetic memory device comprising:  
2                     applying a first current to at least one conductor within a second set of  
3                     conductors, said first current providing energy to heat the magnetic  
4                     storage cell;  
5                     after the magnetic storage cell is heated, applying a second current to at least  
6                     one conductor in a first set of conductors, said second current  
7                     providing a magnetic field to write data to said storage cell; and  
8                     then removing said first current to a second conductor.

1           17.     The method of claim 16, wherein said storage cell is a magnetic storage cell.

1           18.     The method of claim 16, wherein said storage cell is a spin tunneling storage  
2                     cell.

1           19.     An electronic device comprising:  
2                     a processor;  
3                     an input device coupled to said processor;  
4                     an output device coupled to said processor;  
5                     and a memory device coupled to said processor, wherein said memory device  
6                     comprises;  
7                     an array of a magnetic storage cells, each region comprising a first magnetic  
8                     layer, a second magnetic layer, and a dielectric in between each said  
9                     first and second magnetic layers;  
10                    a first set of conductors to receive current for writing data to said magnetic  
11                    storage cells; and

12           a second set of conductors for applying a voltage across said at least one  
13           magnetic storage cell for heating said at least one magnetic storage cell  
14           prior to writing a bit of data to said at least one.

1           20       The electronic device of claim 19, wherein the array of magnetic storage cells  
2                   comprise random access memory.

1           21.       The electronic device of claim 19, wherein said first magnetic layer has a fixed  
2                   orientation of magnetization and the second layer has a non-fixed  
3                   orientation.

1           22.       The electronic device of claim 19, wherein at least one of said second set of  
2                   conductors includes a resistive heating element for heating each  
3                   magnetic storage cell when current flows through said heating element.

1           23.       A magnetic storage cell comprising;  
2                   a first magnetic layer, a second magnetic layer, and a dielectric in between said  
3                   first and second magnetic layers;  
4                   a first set of conductors positioned above and below said first and second  
5                   magnetic layers for writing to said magnetic storage cell; and  
6                   a second set of conductors positioned above and below said first and second  
7                   magnetic layers for applying a voltage across a said magnetic storage  
8                   cell for heating said selected magnetic storage cell prior to writing a bit  
9                   of data to said magnetic storage cell and for reading the data bit that is  
10                  stored on said magnetic storage cell.

1           24.       The magnetic storage cell of claim 23, wherein said magnetic storage cell is a  
2                   spin tunneling storage cell.